

Turbulence - Homework 3

Matheus Montenegro Nunes

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1 About the article

$$\frac{\partial u_i}{\partial x_i} = 0 \quad (1)$$

$$\frac{\partial(u_i + u'_i)}{\partial x_i} = 0 \quad (2)$$

$$\frac{\partial u_i}{\partial x_i} + \frac{\partial u'_i}{\partial x_i} = 0 \quad (3)$$

$$\frac{\partial u_i}{\partial x_i} = 0 \quad (4)$$

2 About the article

$$\frac{\partial u_i}{\partial t} + u_j \frac{\partial u_i}{\partial x_j} = -\frac{1}{\rho} \frac{\partial p}{\partial x_j} + \nu \frac{\partial^2 u_i}{\partial x_j \partial x_j} \quad (5)$$

$$\frac{\partial u_i}{\partial t} + \frac{\partial u'_i}{\partial t} + u_j \frac{\partial u_i}{\partial x_j} + u_j \frac{\partial u'_i}{\partial x_j} + u'_j \frac{\partial u_i}{\partial x_j} + u'_j \frac{\partial u'_i}{\partial x_j} = -\frac{1}{\rho} \frac{\partial p}{\partial x_j} - \frac{1}{\rho} \frac{\partial p'}{\partial x_j} + \nu \frac{\partial^2 u_i}{\partial x_j \partial x_j} + \nu \frac{\partial^2 u'_i}{\partial x_j \partial x_j} \quad (6)$$

$$\frac{\partial \bar{u}_i}{\partial t} + \bar{u}_j \frac{\partial \bar{u}_i}{\partial x_j} + \bar{u}'_j \frac{\partial \bar{u}'_i}{\partial x_j} = -\frac{1}{\rho} \frac{\partial \bar{p}}{\partial x_j} + \nu \frac{\partial^2 \bar{u}_i}{\partial x_j \partial x_j} \quad (7)$$

3 About the article

$$\frac{\partial \theta}{\partial t} + u_j \frac{\partial \theta}{\partial x_j} = \Gamma \frac{\partial^2 \theta}{\partial x_j \partial x_j} \quad (8)$$

$$\frac{\partial \theta}{\partial t} + \frac{\partial \theta'}{\partial t} + u_j \frac{\partial \theta}{\partial x_j} + u_j \frac{\partial \theta'}{\partial x_j} + u'_j \frac{\partial \theta}{\partial x_j} + u'_j \frac{\partial \theta'}{\partial x_j} = \Gamma \frac{\partial^2 \theta}{\partial x_j \partial x_j} + \Gamma \frac{\partial^2 \theta'}{\partial x_j \partial x_j} \quad (9)$$

$$\frac{\partial \bar{\theta}}{\partial t} + \bar{u}_j \frac{\partial \bar{\theta}}{\partial x_j} + \bar{u}'_j \frac{\partial \bar{\theta}'}{\partial x_j} = \Gamma \frac{\partial^2 \bar{\theta}}{\partial x_j \partial x_j} \quad (10)$$

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